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CORRESPONDENCE

Expanding the role of PoCUS in tailoring diuretic strategies for congestion management in critical care

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Ostermann et al. recently highlighted the role of diuretics in managing fluid overload (FO) in critically ill patients [1]. Their discussion underscores the association between FO and increased morbidity and mortality, partly due to its detrimental effects on organ function. In particular, the impact of FO on kidney function has become increasingly recognized. This condition, termed congestive nephropathy (Fig. 1), refers to the retrograde transmission of elevated central venous pressure (CVP) to venous territories caused by increased right ventricular filling pressures [2]. The authors highlight the utility of Doppler-based scores, such as the Venous Excess Ultrasound (VExUS) grading system, in phenotyping venous congestion [1]. While VExUS provides valuable insights, multi-organ point-of-care ultrasonography (PoCUS) offers a broader perspective by enabling comprehensive hemodynamic assessment. PoCUS facilitates the evaluation of pulmonary tissue congestion and pleural effusion through lung ultrasound. Additionally, it allows for a qualitative assessment of cardiac morphology and function. Advanced users can estimate left and right ventricular filling pressures using pulsed-wave Doppler and tissue Doppler imaging. Since VExUS is not specific to FO, simultaneous cardiac imaging is essential [3]. Compared to traditional tools, PoCUS provides real-time, actionable bedside data, enhances decision-making in FO management, and does not involve radiation exposure.

We agree with Ostermann et al. [1] on the importance of structured training programs to enhance the utility of tools like the VExUS score and other Doppler-based assessments [4]. These tools are feasible to implement, with success rates of 85–99% reported for Doppler-based measurements and excellent interobserver reproducibility for VExUS. Even minimal training significantly improves diagnostic sensitivity, demonstrating their accessibility for early clinical adoption [3, 4]. Emerging evidence further underscores the value of Doppler imaging in guiding individualized fluid management strategies. Specific patterns, such as pulsatile portal venous flow and discontinuous intrarenal venous flow (biphasic or monophasic), are linked to higher acute kidney injury (AKI) risk and poor diuretic response, respectively [5]. These findings highlight the potential of PoCUS and Doppler imaging to improve fluid management outcomes, particularly when integrated into broader training programs and acute care settings.

Ostermann et al. emphasize the need for careful monitoring of diuretic strategies to balance efficacy and safety [1]. While loop diuretics remain the cornerstone of therapy, they face limitations, including resistance to venous congestion or hypovolemia. PoCUS can help tailor diuretic therapy to specific congestion phenotypes and, combined with urine biomarkers, differentiate hemodynamic changes or permissive AKI from true tubular damage in patients with rising serum creatinine during decongestion. In such cases, maintaining or increasing diuretics may be justified, as the rise in serum creatinine often reflects glomerular hemodynamic changes rather than tubular injury [3]. PoCUS also aids in monitoring

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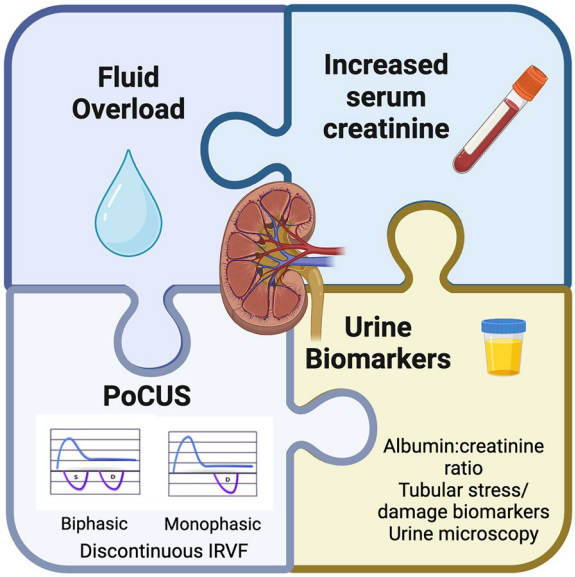

Fig. 1 Key diagnostic components of congestive nephropathy. *PoCUS* Point-of-care Ultrasonography, *IRVF* Intrarenal Venous Flow

hemodynamic improvements and guides adjunctive treatments such as albumin for hypoalbuminemia or hypertonic saline for hyponatremia.

Integrating advanced monitoring tools like PoCUS with tailored diuretic strategies marks a significant step forward in critical care. By providing real-time, actionable insights into congestion phenotypes, PoCUS enhances both the precision and safety of fluid management. Moving forward, research should prioritize standardizing training protocols, refining clinical guidelines, and evaluating cost-effectiveness to ensure broad accessibility and optimal implementation across diverse clinical settings.

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Data availability
Not applicable.

Declarations

Conflicts of interest
GR-G, JS-M, AK and AKo has no conflicts to disclose. CR acts as an advisory board member for ASAHI, Baxter, GE, Jafron, and Medtronic and has received speaker fees from Astute, bioMérieux, B. Braun, CytoSorbents, ESTOR, FMC, and Toray, all unrelated to this work.

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